

Safety

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Figure 1. Safe ladder practices frequently are compromised when wildlife control operators (WCO) are pressured for time.

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Overview

Wildlife damage management (WDM) is an exciting field with many opportunities to provide solutions to the complex issues involved in human-wildlife interactions. In addition, WDM wildlife control operators (WCO) face a variety of threats to their physical well-being. Injuries can result from misused (Figure 1), faulty, or poorly maintained equipment, inexperience, mishandled wildlife, harsh weather, and dangerous situations, such as electrical lines.

The goals of this publication are to:

- Develop an awareness of safety issues

and adopt a mindset of “Safety First”,

- Review the major safety threats that WCOs face,
- Provide basic information for WCOs to protect themselves, and
- List resources for further information and training.

Although no statistics are available for the WDM industry in particular, the authors are aware of several instances where WCOs have lost their lives or suffered serious injuries while performing WDM.

While accidents do happen, most are preventable and occur due to hurried behavior, neglect of procedures, or lack of attention to the task at hand.

The United States, Canada, and Mexico have agencies tasked with setting and enforcing standards to assure safe and healthful conditions for workers. The U.S. agency is the Occupational Safety and Health Administration (OSHA). In Canada, it is the Labour Program, and in Mexico, the Ministry of Labor and Social Welfare governs workplace requirements. Readers are encouraged to keep abreast of government safety regulations not only to follow the law, but also to maintain a safe working environment.

Safety is an extremely broad and complex topic. The number and diversity of situations that pose safety risks to WCOs are numerous. This publication focuses specifically on safety risks to the WCOs' physical wellbeing, such as injuries. Safety concerns pertaining to organizational design, worker supervision, disease, environmental or social catastrophes, or pesticides are beyond its scope.

Safety First

Safety is no accident. Everyone must take safety seriously and be committed to following safe work practices. When commitment to safety fades, injuries are sure to follow. "Safety First" requires taking proactive steps to eliminate or manage risks of injury at the job site.

"Safety First" begins with the need for WCOs to maintain their physical and mental well-being. Wildlife damage management activities are demanding, both physically and mentally. Poor diet; alcohol; the improper use of drugs or medications; and lack of exercise and sleep can increase the likelihood of injuries due to a lack of physical fitness and decline in mental acuity. Maintenance of one's physical and mental health is important, especially when working long hours. Research has shown that people working over 8 hours a day have significantly higher rates of injury when compared to those working 6 to 8 hours a day. Likewise, individuals who sleep less than 7 hours a day or who sleep poorly experience higher rates of injury.

Awareness of Hazards and Risk Reduction

Working safely begins with developing an awareness of the potential hazards associated with each job, then identifying strategies to reduce the risk of injury or illness. OSHA encourages the use of a Job Hazard Analysis, also known as Hazard Analysis (HA), as a method for identifying hazards and reducing risks of injury or illness. This method involves mentally or physically walking through the job and considering the following:

- what could go wrong,
- what circumstances could cause or contribute to incidents,
- what are the expected consequences if an incident occurs,
- what is the likelihood of an incident occurring, and
- what actions can be taken to reduce the likelihood or consequences of an incident.

Hazards to consider include potential injuries from impact, penetration, compression (roll-over or caught in/between), slips/trips/falls, sprains/strains, chemical inhalation/ingestion/contact, heat/cold or hot/cold surfaces, harmful dust, light (optical radiation), sound (high noise), biologic (animal assaults or contact with infectious microorganisms harbored by animals), pressurized systems, electricity, and machines. Record the information using a simple three-column table with headings titled Basic Job Steps, Potential Hazards, and Recommended Hazard or Risk Reduction Techniques.

After identifying hazards, select appropriate techniques or actions that will eliminate or reduce the risk of injury or illness. Eliminate the hazard, if possible. When considering ways to eliminate a hazard, consider whether safer materials, processes, or equipment are available or if modification or automation are possible. If the hazard cannot be eliminated, then use risk reduction techniques or controls.

The National Institute of Occupational Safety and Health (NIOSH) categorizes injury prevention controls into three categories of descending value— engineering, administrative, and personal protective equipment (PPE). If it is not feasible to eliminate the risk altogether, the next best option is to implement some sort of engineering control to eliminate or reduce the risk. An engineering control eliminates a hazard or places a barrier between the worker and the hazard. For instance, the level sensor on a scissor lift prevents movement of the lift whenever the lift is off-balance. By installing this sensor, manufacturers eliminate the need to rely on operator judgment.

If an engineering control is not feasible, the next best option is administrative control. Administrative controls typically consist of rules or procedures to keep workers away from hazardous situations or substances. Examples of administrative controls include the posting of warning signs, worker training, job rotation to reduce the exposure time to a hazard, and written safety protocols or procedures. Administrative controls are effective, but not to the degree of engineering controls because they rely on supervisor oversight and worker compliance.

The final, and least preferable of the three control methods, is the use of PPE. PPE consists of specialized clothing and devices worn by workers to shield them from potential hazards. Examples include gloves, safety goggles, respirators, hearing protectors, and coveralls. Unfortunately, PPE is only effective if workers use the equipment correctly. Too often, workers avoid using PPE because it is uncomfortable or makes completing the task more difficult. Although purchasing higher quality equipment can reduce some of these complaints, WCOs must understand that the long-term benefits of protection outweigh any short-term discomfort. Since most WDM activities occur in settings where engineering and administrative solutions are impractical, WCOs frequently rely on PPE to protect themselves.

Hazard analysis (HA) consists of hazard identification and selection of risk reduction strategies. While HA may appear tedious and states the obvious, the process is essential for emphasizing the importance of safety and identifying potential hazards involved in a specific activity. Regular

reviews of HAs also reinforces safe practices and identifies new risks and solutions. Consult [OSHA 3071 Job Hazard Analysis 2002 \(Revised\)](#) for more information.

Safe Work Practices

This publication highlights the following five areas to consider when developing safe work practices:

1. Environmental conditions
2. Dangerous locations
3. Personal protective equipment (PPE)
4. Vehicle safety
5. Crime prevention

Environmental Conditions

Wildlife control activities take place under a variety of weather conditions and landscapes. While WCOs cannot control the environment or the habitat, they can reduce the risk of injury by not working when conditions are the most threatening.

WCOs should monitor weather reports to ensure that they are prepared for the forecasted conditions. Although forecasts are not perfect, meteorological science has improved enough to have high confidence in forecasts reaching out 72 hours in the future. Pay particular attention to the following threats from weather as they have significant impacts on human health and safety.

Ultraviolet Radiation

Long-term exposure to the sun and ultraviolet (UV) radiation significantly raises the likelihood of developing skin cancer and cataracts. Ultraviolet radiation is strongest between 10 AM and 2 PM, on clear sunny days, and at high elevations. Clouds, haze, and dust disperse UV radiation, but do not eliminate exposure.

WCOs should protect themselves against excessive exposure to UV radiation by wearing long-sleeved shirts, pants, and broad-brimmed hats whenever possible. Apply a generous amount of sunscreen lotion (SPF 15 or higher) to exposed skin. Reapply every 2 hours and after swimming or excessive sweating. Corrective lenses manufactured to U.S. standards will protect eyes to varying degrees based on lens composition (e.g., polycarbonate, plastic, glass) from UV-A and UV-B radiation. Select prescription glasses and sunglasses rated to protect against passage of 99% or more of the UV-A and UV-B rays. The darkness level of the lenses does not affect their ability to block UV rays.

The National Weather Service has developed a UV Alert System that provides a numeric scale (0-16) for UV radiation for the day. Ratings of 6 or higher are considered high and indicate that extra precautions should be taken to prevent sun damage.

Heat

Exposure to high temperatures is a leading cause of weather-related deaths in the United States. Hot weather hinders the body’s ability to cool itself, which leads to heat exhaustion and heat stroke. The National Weather Service created the Heat Index (HI) to quantify what people will experience. The HI calculations are based on air temperature and relative humidity (Figure 2). Alerts are

issued when the HI is expected to exceed 105 °F. Workers exposed to direct sunlight should adjust their work schedules even more as the HI assumes shaded conditions. OSHA’s [Heat Safety Tool](#) is available as an app for iPhones or Android smart phones. It calculates the HI and provides suggestions to protect against heat-related injuries.

Workers operating in high HI conditions should be alert to signs of painful muscle cramps (heat cramps), extreme sweating accompanied by weakness (heat exhaustion), and altered mental state. Failure to treat heat exhaustion can lead to the life-threatening condition known as heat stroke where the victim can suffer brain damage or even die. Signs of heat stroke include a throbbing headache, fainting, and lack of sweat even in the high temperatures. OSHA has a [factsheet](#) on heat safety.

Schedule strenuous work, such as building trenches and cleaning attics, to cooler months or at least cooler parts of the day. Take frequent breaks to cool down and rehydrate. Drink plenty of non-caffeinated and non-alcoholic beverages. Use fans or sun shields, soak clothes in cool water, or wear a cooling vest (Figure 3) to reduce heat stress.

Cold

Cold weather poses a number of threats to the well-being of workers. Excessive exposure to cold conditions can lead to frostbite and hypothermia. Frostbite occurs when body parts are exposed to cold conditions for so long that the cells freeze. Frostbite typically occurs in the extremities (i.e. hands, feet, nose, and ears). Workers should be alert to signs and symptoms of frostbite, such as reddened skin or skin turning pale. Hypothermia sets in when the core body temperature dips below 95 °F. Workers should suspect hypothermia if they notice excessive shivering or loss of mental acuity. Both frostbite and hypothermia can occur slowly or rapidly depending on the temperature and the body’s ability to maintain its heat. Move anyone showing those signs to shelter and contact medical personnel. The National Weather Service has created a Wind Chill Index (WCI) to quantify how wind and cold can combine to make

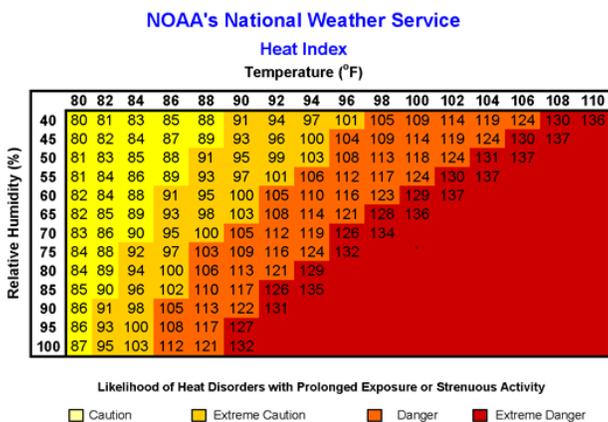


Figure 2. Heat Index.



Figure 3. Cooling vests help keep core body temperature low.

the outside temperature feel colder than it actually is (Figure 4).

Workers should prepare themselves for cold conditions by wearing layers of clothing and protecting themselves from wind and rain. Give special attention to clothing that protects hands and feet.

Cold temperatures also cause dangerous environmental conditions through snow and ice. These combine to create slip hazards. Walk with a slow and deliberate gait, hold onto handrails, and wear slip-resistant shoes to reduce the risk of falling. Drive defensively to account for reduced stopping distances. Install snow tires and create emergency kits for your vehicle in case you are stranded. Kits should include a blanket, flashlight, heat packs, cell phone and charger, emergency road signs, high-calorie non-perishable food, battery cables, water container, matches, shovel, tow rope, tissues, and first aid kit.

Lightning

Lightning poses a significant threat to human health. Ninety percent of individuals struck by lightning suffer disabilities of varying degrees. Seek shelter inside a permanent building or hard-topped vehicle. A good rule of thumb is “When thunder roars, go indoors,” because lightning can kill individuals miles away from the storm clouds. Avoid the temptation to leave shelter when the rain stops because lightning can still strike as the thunderhead is moving away from the area.

Tornados

Tornados present a severe threat to safety due to their unpredictability. Although warning systems have been set up in many areas, WCOs should not assume they will hear them. Fortunately, several cell phone apps are available to warn users of alerts issued by the National Weather Service. It is recommended that WCOs download one suitable for their phone. WCOs should check weather forecasts before heading into fieldwork since cellphone coverage may not be available. Avoid working out-of-doors when severe weather is forecast.

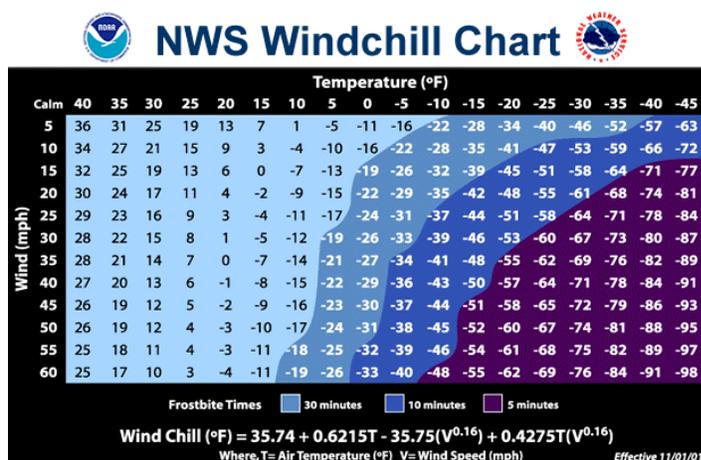


Figure 4. Wind Chill Index.

Dangerous Locations

Dangerous locations, such as crawling in confined spaces or working on a ladder, frequently confront WCOs and warrant special mention.

Confined Spaces

According to the OSHA definition, confined spaces are locations that have limited or restricted entry or exit and are not designed for continuous occupancy. Confined spaces may require additional attention if they contain hazards, such as exposed electrical wires, hazardous atmospheres, extreme temperatures, moving parts or machinery, low light conditions, or engulfment (e.g., water, deep grain, etc.). Examples of confined spaces that WCOs typically enter include attics, knee wall cavities, pits or sumps, crawl spaces, and sewers.

Before entering a confined space, WCOs need to ensure the following:

- Access is clear and the space is large enough and configured to allow safe entry and exit.
- Two sources of light are available, such as a spotlight and hands-free light.
- The space is well ventilated or ventilation is established and the task does not have the potential to create a hazardous atmosphere (e.g., spraying/fogging of pesticides, torch cutting).
- PPE is used and appropriate to the space conditions and intended task.
- Identified hazards are eliminated before entering the space (e.g., disengage electrical service to the area if exposed wires are suspected, isolate water valves, shut off unguarded fans, etc.).
- Notify someone of the location and situation or have a second person standing by to assist, if needed.

Before entering a confined space, WCOs are strongly encouraged to use a portable meter to check the

atmosphere of unventilated confined spaces or spaces that may contain chemical vapors. Confined space meters are available commercially and most are configured to detect oxygen content, combustible vapors, carbon monoxide, and hydrogen sulfide. OSHA regulations state that a confined space potentially containing an uncontrolled hazard (atmospheric or other) must be entered only under the terms of a written permit system.

Wear PPE prior to opening a hatchway. Open the hatchway carefully to minimize disturbance of dust and debris. Pause a few seconds before entering to allow dust to settle. Turn on the flashlight and begin to investigate the area immediately surrounding the opening. Look for potential hazards, such as feces, exposed wires, vermiculite insulation, and animals. In attics, place weight only on the joists. Ideally, weight should be distributed across multiple joists by the use of a 2"x 8" board laid across the floor and secured in place with screws. Do not continue if the joists are bowing more than ¼ inch.

Heights and Roofs

A wise person once said, "It's not the height or the fall that scares me, it's the ground." The concern is well placed as research shows that 30% of all injuries sustained by roofers result from falls or slips.

According to OSHA requirements, fall protection procedures must be implemented whenever workers operate 4 feet or more above an adjoining surface. Selection of fall protection equipment depends on the length of time at the work site, the type of work being performed, the slope of the surface where work will be performed, and the height. For example, for short-term activities on low-slope roofs (10° or less, 2.12:12 pitch), flagged warning lines with minimum tension strength of 500 pounds positioned 34 to 45 inches above the roof and 6 feet from the edge may be sufficient. For steeper angled surfaces, WCOs may need to use catch platforms, toe boards, railings, or personal fall protection equipment. Slopes greater than 36.26° (7:12 pitch) require personal fall protection, catch platforms, scaffold platforms, railings, or toe boards. Obtain training on the proper use of full-body harnesses before using them. Improper use of a full-body harness can result in severe injury and even death. Body-

belts for fall protection have been banned since 1998. Wear soft-soled shoes with good traction to reduce the risk of slipping. Shoes specifically designed for walking on roofs have been developed. Avoid walking on roofs that are wet or have debris on them. Do not walk backwards or operate devices that require pulling unless you are anchored to a personal fall protection device. Operate on roofs in a manner appropriate to the roofing material. For example, roofs shingled with slate or pottery tile may crack or cause slippage if walked on directly. In these situations, workers should use a ladder-hook to help distribute their weight.

Ladders

Falls due to improper use of ladders are a common source of job injuries for WCOs. Common types of ladders include extension, step, and articulating. Choose ladders with the appropriate duty rating for the load they will bear. Type IAA ladders are rated to 375 pounds; Type IA to 300 pounds, and Type I to 250 pounds. The load includes the person and tools. Do not exceed the duty rating of the ladder. Use ladders made from fiberglass or other material resistant to the flow of electricity when near sources of electricity. NIOSH has created a [Ladder Safety](#) app for smart phones that reviews ladder selection, inspection, positioning, accessorizing, and safe use.

Carry a cell phone. Have two people present on jobs with extensive ladder work. If a worker does not feel safe on a ladder, they should not continue. Rent a bucket lift or other type of mechanical lift in lieu of a ladder. The rental agency will provide instructions, and personal fall protection (i.e., harness and lanyard) may be necessary depending on the type of lift.

Choose the correct ladder for the situation. Never use ladders in a manner for which they were not designed.

Check all ladders for damage and defects before each use. Ladders should not be bent, have splinters, have damaged welds, or have loose or damaged parts. The rubber fittings on the feet of the ladder should be in good condition. If they are not, replace them. Check stabilizers and levelers. If the integrity of a ladder is in doubt, mark it as unsafe and throw it away. Replace unsafe components with parts approved by the ladder manufacturer.

Before moving a ladder into place, check the area for potential hazards such as holes, ledges, power lines, tree limbs, or other items that could prevent safe placement of the ladder. Consider the potential for foot or vehicle traffic around the potential ladder site. If the area cannot be secured, find another location. Determine if assistance is needed in order to safely place the ladder. It is recommended that two workers operate ladders taller than 16 feet (extending to 32 feet). Never drag or drop a ladder. Ensure that the ladder is level and properly stabilized so it will not wobble.

Climb slowly and surely. Always face the ladder. A worker should keep three parts of their body in contact with the ladder at all times (both hands and a foot, or both feet and a hand). Do not carry heavy or bulky items when climbing. Pull items up with a towline, attach them to a tool belt, or have them handed to the worker. Wear shoes with strong soles and keep them clean for maximum traction. All steps and rungs should be clean and free of debris or other items that could cause slips. Ladder rungs must be parallel to the ground surface when the ladder is in use. Never lean or reach to the side; a worker's shirt pockets should not extend beyond the sides of the ladder.

Never move the ladder while anyone else is standing on it. Always move or reposition a ladder while standing on the ground. Check for anything that could interfere with climbing and descending a ladder.

Vibration and jostling during transport can damage ladders. Install heavy-duty ladder racks on service vehicles. Always check that ladders are secured properly to the vehicle *before* leaving the service site. Some WCOs place the ladder straps on the driver's seat to ensure that they do not drive off without securing the ladder.

Protect ladders from the elements and store ladders by themselves. Do not place anything on top of ladders. Follow manufacturer guidelines on the storage of ladders to prevent warping and other damage.

For more details on the proper use of ladders, visit [OSHA's website](#). Other reliable sources of information on ladder use include the American Ladder Institute and ladder manufacturers. For more information on the safe use of extension and step ladders, please see the [Appendix](#).

Water

Many WDM activities occur on or near water, such as trapping beaver or rounding up Canada geese. Water poses two primary risks namely, drowning and hypothermia.

Workers should learn about the bodies of water they will be working around in advance. As a rule, moving water (i.e., rivers or streams) is a greater hazard than still water (i.e., lake or pond). Monitor weather reports to prepare for slippery conditions, flooding, and flash floods.

Carry a sturdy walking stick to measure water depth and detect hidden terrain hazards when wading in streams and creeks. Wear U.S. Coast Guard-approved life jackets or buoyant work vests whenever work poses a risk of drowning. Flotation devices are essential safety gear when operating watercraft and when working in fast moving water or near water below 60 °F. Cold water poses a particular risk because it can remove heat from a human body 25 times faster than air of the same temperature. Even moderately cold water poses a significant risk. Water with a temperature between 40 to 50 °F can exhaust a person in 30 to 60 minutes.

Electricity

Powerlines and exposed wires pose significant risk to WCOs. Do not place ladders closer than 10 feet to unprotected electrical wires. Make sure that ladders can not come into contact with powerlines as they are moved. Be cautious when entering attics and other unfinished areas of a structure where wires may be exposed. Be particularly careful in older homes with extensive damage by rodents and outdated wiring. Have utility lines located and marked before digging.

Asbestos

Exposure to asbestos continues to pose risks to WCOs due to the variety of products manufactured with it. Many homes have vermiculite insulation that contains asbestos. It is impossible to distinguish vermiculite that contains asbestos from vermiculite that does not with the naked eye. All vermiculite insulation is a pebble-like, pour-in

product and is usually gray-brown or silver-gold in color. See the [EPA website](#) for more information on identifying asbestos.

Do not disturb vermiculite insulation. Doing so could lead to inhalation or ingestion of asbestos fibers, which is a known health risk. If vermiculite insulation must be disturbed, have it tested by a qualified professional before conducting any work. If the vermiculite contains asbestos, a contractor qualified in asbestos removal should remove it from the work area.

Lead Paint

Lead-based paint was used in many homes throughout the U.S. prior to 1978. Common repair activities such as sanding, cutting, grinding, etc. on surfaces painted with lead-based paint can liberate the lead and expose not only the WCO, but also household members. Children are particularly susceptible to adverse health effects from exposure to lead. Therefore, the Environmental Protection Agency has requirements for anyone performing lead-based paint abatement or renovation, repair, or maintenance activities for compensation in a home or child-occupied facility (e.g., daycare, school). The person must be trained and certified in lead-safe work practices (40 CFR Part 745).

If it is necessary to conduct activities in a pre-1978 home or child-occupied facility (e.g., daycare, school) that may disturb painted surfaces, ask the owner about the presence of lead-based paint. If no information is available, refrain from activities that may disturb the paint until it has been inspected and tested by a properly credentialed lead-based paint inspector. If in doubt about prohibited activities, consult your local Health Department.

Personal Protective Equipment and Other Basic Equipment

Personal Protective Equipment (PPE) encompasses products designed to prevent bodily injury to the wearer. Often, PPE is the last line of defense against injury.



Figure 5. Plastic and leather gloves are essential safety items.

Gloves

Protective gloves are required at various times for everyone working in WDM. Leather and cloth gloves help keep hands clean as well as protect them from cuts, scrapes, and animal bites. Unfortunately, increases in hand protection result in loss of tactile sensitivity and dexterity. Thus, WCOs should have at least two types of protective gloves, one for general protection and another for handling animals or heavier duty applications. Select gloves that provide protection and sufficient dexterity for the task at hand.

Leather and cloth gloves are not designed to protect against chemical or infectious material hazards. Generally, these hazards will require an impervious rubber-like glove. Wear surgical, exam-like gloves when contact with potentially infectious agents is possible (e.g., contact with animal feces or secretions). These may be worn under leather or cloth gloves (Figure 5), but the outer gloves must be washed after use and before being worn again. Chemical-resistant gloves are made from a variety of materials (e.g., butyl, nitrile, latex, neoprene), each with resistance to different classes of chemicals. They also come in varying thicknesses. Consult the glove manufacturer to determine which glove is best suited for the job. Latex can cause allergic responses in some people.

Knees Pads and Headgear

Use knee pads to protect knees when crawling in attics and crawl spaces. Various styles are available.

Trauma to the head can result in long-term disability and death for the victim. Increasingly, researchers are raising concerns over how multiple small bumps to the head can affect the brain negatively over time. Helmets or bump caps can protect against head trauma, but the proper type of head protection must be selected based on the potential hazard. Helmets or hard hats are designed to specific American National Standards Institute (ANSI) standards and are intended to provide protection from impact blows from falling or moving objects (Figure 6). They also may be rated to provide protection from electrical shock.

WCOs rarely wear helmets, as the headgear is cumbersome and can obstruct their view. A bump cap provides an alternative to a helmet. It is intended to provide protection from injury resulting from bumping the head against fixed objects that often occur while in an attic, crawl space, or other area with limited head clearance. Unfortunately, bump caps offer no protection from falling objects or electricity. Wear head protection appropriate for the situation.

Eye Protection

Wear eye protection when eyes are at risk of being injured, irritated, or burned. Do not rely on ordinary corrective



Figure 6. Helmets protect against falling objects.

lenses unless they have been manufactured to meet ANSI safety eyewear standards. Select the eye protection appropriate to the hazard. Safety glasses with side shields provide protection against impact injuries, while goggles provide protection against impact, dust, and splashes (Figure 7). Face shields can be paired with goggles or safety spectacles to provide protection to the whole face. However, never consider a face shield as a substitute for protective eyewear; it is only a supplement.

Ear Protection

Wear ear protection to protect against noise-induced hearing loss. OSHA's noise exposure limit is 90 dBA (decibels, A-weighted scale) expressed as an 8-hour Time Weighted Average (TWA). This means that the exposure limit is based on sound intensity (sound pressure level) and duration (time length) of exposure. For every 5 dBA increase in sound level pressure, the allowable exposure

time is halved. For example, the maximum exposure time is 4 hours for noise at 95 dBA, 2 hours for noise at 100 dBA, 1 hour for noise at 105 dBA, 30 minutes for noise at 110 dBA, and 15 minutes for noise at 115 dBA. Normal conversation is about 60 dBA, a hand drill operates at about 98 dBA, and an ambulance siren is about 120 dBA. Sound meters are available for less than \$100. Although not as accurate, sound measuring apps for cell phones are available for just a few dollars.

Hearing protection comes in three forms— ear canal caps, ear plugs, and ear muffs. Ear canal caps are not recommended because they do not extend into the ear canal, leading to noise “leakage.” Ear plugs and ear muffs can be used alone or in combination (Figure 8). Noise cancellation varies between different makes, models, and manufacturers of hearing protectors, and is expressed as a Noise Reduction Rating (NRR). The higher the NRR, the greater the ability to reduce noise (attenuation). Select



Figure 7. Protective eyeglasses (left) and goggles (right).



Figure 8. Ear plugs (left and right) and ear muffs (middle).

hearing protectors with adequate sound attenuation and use the devices correctly to achieve the necessary level of protection. To calculate the noise attenuation achieved, subtract 7 from the NRR, divide the result by 2, and subtract the final number from the measured noise level. For example, if the noise generated by an operation is measured at 100 dBA, hearing protection with a NRR of 37 will attenuate the sound to 85 dBA $[(37-7) \div 2 = 15; 100-15 = 85]$. Research has shown that many workers receive only a small fraction of the protection available from hearing protection equipment due to improper fitting. As with respirators, hearing protection only works when worn properly.

Lung Protection

Respirators protect workers from exposure to airborne particles and chemical vapors that can damage their health. A wide variety of respirators are available, and proper selection depends on the type and concentration of the contaminant. Respirators may be disposable or reusable. They may be tight-fitting to the face or of a hood-like design. Tight-fitting respirators may be quarter, half, or full face. Regardless, only NIOSH-approved respirators should be used. A dust mask available at the local hardware store does not qualify as a true respirator.

Respirators add physical demands to the body, which is why OSHA regulations stipulate that people who wear respirators must be medically qualified. This means that a physician has determined that the worker is physically capable of wearing a respirator without posing significant risk to their health.

Most respirators are designed to filter contaminants from breathed air. Therefore, they will not provide protection in oxygen-deficient atmospheres. In addition, the type of filter used with the respirator must be appropriate to the airborne contaminants. Particulate filters will not protect against chemical vapors. Chemical vapor cartridges will not protect against particulates, and are specific to the type of chemical vapor (e.g., acids, organic vapors, ammonia, etc.). When more than one type of contaminant is present, a combination of cartridges may be needed.

NIOSH has established designations to identify the appropriate use conditions for different types of particulate filters. Filters with an “N” designation are not resistant to oil. Filters with an “R” designation are somewhat resistant to oil. Filters with a “P” designation are strongly resistant to oil. Filters with a “95” designation will filter at least 95% of the airborne particulates. Filters with a “99” designation will filter at least 99% of the airborne particulates. Filters with a “100” designation will filter at least 99.97% of the airborne particles. These designations are used in combinations. For example, if oils are expected in the atmosphere, use R95, R99, P95, or P99 filters. Filters and vapor cartridges have limited life-spans and must be replaced at the manufacturer’s recommended interval, which will vary with environmental conditions. They must be protected from contamination when not in use, and respirators must be cleaned and cared for properly. Do not use disposable respirators more than once.

Except for loose-fitting, hood-type respirators, a good seal must be obtained between the respirator and the wearer’s face. Therefore, it is important to select the proper size and to be clean shaven. OSHA’s Respiratory Protection regulations require those who wear respirators to be fit-tested by a qualified person prior to use to ensure that the respirator is the proper size for the user and a good face seal can be obtained. Good face seals are highly dependent on proper use and care of the respirator. Thus, OSHA’s regulation also contains a requirement to train workers in proper care and use. Consult OSHA’s website for additional information on the required elements of a Respiratory Protection Program. Failure to properly wear and care for a respirator can present more of a hazard than the atmosphere causing concern.

In many situations, WCOs want to protect themselves from dust, dander, dried animal feces, and similar particulates that are present in low concentrations, such as during routine attic or crawl space inspections. In these cases, a filtering facepiece or half-face elastomeric respirator with N95 or N99 particulate cartridges usually is sufficient. When the conditions are extremely dirty or there also is need to protect the eyes/face, select a full-face elastomeric respirator with the appropriate particulate cartridge. These three pieces of equipment are shown in



Figure 9. Disposable filtering facepiece (left), reusable half-mask respirator with particulate filters (middle), and reusable full face respirator with particulate filters (right).

Other Clothing

Clothing plays an important role in protecting skin and feet from injury, as well as helping maintain a constant temperature. All clothing, including uniforms, should be made of durable, comfortable materials that can withstand outdoor conditions. Choose fabrics appropriate to the expected environmental conditions.

WCOs should wear hats to protect their face from the sun, keep rain out of their eyes, minimize body heat loss in cold conditions, and cushion bumps to the head. Choose hats with adjustable clasps. Knit caps are preferable for protection against the cold.

Shirts should be comfortable and loose fitting to allow freedom of movement in tight areas. Wear a long-sleeved shirt or jacket to protect against the sun, abrasion, other environmental hazards or when mandated by pesticide labels.

Pants should be comfortable and allow for full leg movement. Pockets should be deep enough to hold equipment securely. Choose pants made of material that can withstand wear due to kneeling and tears incurred from squeezing into small spaces or walking through thorny bushes. Generally, long pants are preferable to shorts and are usually mandated by pesticide labels.

Shoes should cover the entire foot, be comfortable to wear, and have soles suitable for the encountered surfaces. For example, flat-bottomed and slip resistant soles are needed on roofs to reduce the risk of falling. Safety shoes with impact-resistant toes and insoles protect against impact from heavy objects and penetration by sharp objects.

Wear disposable coveralls in areas that could be contaminated with infectious organisms (animal droppings are a common source of infection) or when working with pesticides. If you use pesticides, follow the label instructions on selection, use, and laundering of clothing.

Other Basic Equipment

Basic equipment refers to those products that have multiple uses, including the protection and safety of the user. Although WCOs in urban situations have different equipment needs than those working in wilderness areas, the following equipment can be useful in both settings.

Good lighting is essential to operate effectively and safely. Locations where lighting is absent or inadequate are very dangerous because workers may not be able to identify hazards, such as exposed nails or charging animals. It is recommended that WCOs have three lights available to them, namely a general light, a spotlight, and a hands-free light.

Modern **flashlights** have a variety of features, such as beam focus capability, various powering systems, water tolerance, and power levels. Generally, quality and features correlate with price. Unfortunately, comparing flashlights is difficult due to the various ways light strength is advertised. It is recommended that users test lights before purchasing.

General flashlights are suitable for ordinary illumination of closets and walking areas. Incandescent bulbs emit a white light useful for clearly illuminating discolorations, such as rubmarks. However, advancements in light-emitting diode (LED) technology have produced flashlights that are more durable, brighter, and more efficient in battery consumption than their incandescent alternatives.

Spotlights are useful for inspecting structures or performing night surveys of wildlife populations. The light beam should emit at least 500,000 candles in a beam that remains concentrated at 100 yards. Structural settings may be able to get by with flashlights with 1,000 lumens of concentrated light.

Hands-free lights are very useful when a task requires two hands. Lights should be capable of illuminating objects within 3 feet of the user, have adjustable straps, and the ability to adjust the beam's focus and direction.

Use flood or area lights when conditions require lighting of large areas, such as basements or attics. Be sure to use heavy-duty extension cords and service outlets capable of handling the draw of electrical power. Keep flood lights at least three feet away from objects to reduce the risk of fires from the heat of the lamp.

WCOs should keep a **first aid kit** in their service vehicle. Cuts and scrapes occur daily. A kit should include Band-Aids®, gauze bandages, tape, antiseptic ointment, 2 quarts of sterile water, cold and heat packs, and triangular bandages.

Waterless hand sanitizer reduces the risk of infection when soap and water is not available. Choose sanitizers containing at least 60% alcohol. Smear a light coating over hands to kill bacteria. Work it around hands and between fingers until they are dry. Antiseptic disposable wipes have the added benefit of helping to scrub away organic material where germs can hide.

WCOs should alert doctors to their medical history and the fact that they work in close proximity with wildlife, so wildlife-related diseases may be considered. Doctors may recommend certain vaccinations, such as rabies pre-exposure prophylaxis, based on these occupational hazards. For more information on disease and medical safety, visit the Centers for Disease Control and Prevention website or other publications in the WDM Technical Series.

Those working in remote areas should ensure that colleagues and family know their itinerary and schedule along with a "call for help" deadline if you do not return by a certain time/date. In areas where cell-phone service is not available, workers should consider radios, satellite

phones, and personal locator beacons or other means to help others locate them in the event of an emergency.

Vehicle Safety

Injuries from motor vehicle accidents are a significant risk for WCOs. In 2015, U.S. drivers were involved in an estimated 6.3 million police reported motor vehicles accidents (<https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812318>), which led to 35,092 deaths (www.nrd.nhtsa.dot.gov). While nothing can eliminate all the risks inherent in driving, several tactics can substantially reduce the likelihood of an accident.

First, purchase a service vehicle with a high safety rating with both the National Highway Transportation Safety Administration and the Insurance Institute for Highway Safety. Consider safety features, such as back up cameras, anti-lock breaks, etc. that would improve driver control and safe use of the vehicle. Be sure the vehicle is rated to handle the weight and work expected.

Second, ensure that the vehicle is maintained in proper working condition, with particular attention to tires, brakes, lights, windshield wipers, and suspension. Be alert to site hazards, including hidden objects or terrain. A walk-around of the area may be appropriate before engaging the vehicle. Operate vehicles in accordance to traffic laws. Avoid speeding.

Third, be a defensive driver. Wear a seat belt. Use your back-up camera and side mirrors, as appropriate. Do not run red lights or turn without signaling. Leave sufficient distance between vehicles to allow sufficient time for reaction. Reduce speed as appropriate for driving conditions. Avoid distractions. Do not text or use a cell phone while driving. Do not wear ear buds. Map out routes before driving or use a global positioning device.

Employ similar concern for safety features when looking to buy or rent equipment. For example, does the scissor lift have a level sensor that prevents use of the lift when the lift is off-balance. Likewise, purchase heavy duty electrical extension cords that can withstand strenuous use and have grounding plugs.

Crime Prevention

Wildlife control operators frequently work alone in isolated or unfamiliar areas, which make them vulnerable to criminal attacks. WCOs should never allow their attention to the task to prevent them from monitoring their situation. Always survey a job site throughout the day to look for potential threats and identify ways of escape. Awareness of surroundings helps reduce the likelihood of assault. Avoid wearing ear phones so that approaching individuals or objects can be heard.

Before going to a job site, WCOs should notify someone of where they will be and when they will return. If a client or situation raises concerns, consider ways to delay the job until additional help arrives.

Avoid drawing unnecessary attention. Lock and secure unattended vehicles and equipment. Use security boxes, safes, cables, etc. to secure sensitive equipment. Do not wear an expensive watch or flaunt expensive equipment.

When using firearms to control wildlife, WCOs should notify authorities to ensure that they are aware of the WDM activities. It is advisable to notify authorities in advance, as well as when WCOs arrive on scene, as inter-office communication does not always occur.

Do not get involved in altercations to protect equipment or money. Flee danger, whenever possible. Contact police immediately following a criminal incident. Provide the authorities with as many accurate details as possible.

Animal Handling Safety

Handling of traps and wildlife control equipment brings its own risks of cuts, bruises, and punctures, as well as potential exposure to infection. Buy quality traps. For example, use cage traps with ½" x 1" mesh and large handle guards to reduce chances of being scratched by caged animals. Ask trap dealers about safety equipment such as safety clasps for conibear-style traps. Learn from experienced WCOs how to safely catch pole animals, carry and set traps, etc. Likewise, the safe use and storage of firearms has its own set of concerns. WCOs should obtain training and advice from those experienced in the use of firearms before using this tool in field conditions.

Safety and the Law

Legal safety refers to situations where failure to implement safe practices can result in criminal or civil penalties either as a defendant or as a victim. Failure to operate a vehicle in a safe manner can result in legal penalties, as well as physical injury.

OSHA Compliance

Employers must follow OSHA requirements to ensure a safe working environment for workers. Employers must identify hazards, create written safety programs, train workers, monitor worker compliance, and maintain training and incident records.

Information and assistance on OSHA regulations and compliance is available at <http://www.OSHA.gov>. Begin the process by reviewing [OSHA's Compliance/Outreach page](#). The page clearly outlines the steps to become compliant and contains links to templates, training, and specialists to speed the process. [OSHA's Small Business page](#) is also very useful.

Recognize that OSHA sometimes delegates its authority to individual states. Under the delegation of authority, a state may have additional or more stringent requirements than the federal OSHA program. Determine if your state has been delegated authority at [OSHA's State Occupational Safety and Health Plans page](#).

Many private consultants are available to provide even more personalized assistance with OSHA compliance.

Conclusion

Work in WDM poses many safety risks to those involved. Awareness, planning, and deliberate action can eliminate or reduce many threats. As the industry continues to develop, WCOs must keep up with new threats and safety practices to maintain their well-being. Following safe work practices helps to ensure WCOs remain on-the-job and injury free.

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Figure 10. Diagram by Nuisance Wildlife Control Operators Best Practices Guide
Figure 11. Photos by WERNER®

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Glossary

Administrative Control: A method of control that reduces a hazard through one of the following strategies: 1) written operating procedures, work permits, and safe work practices; 2) exposure time limitations (used most commonly to control temperature extremes and ergonomic hazards); 3) monitoring the use of highly hazardous materials; 4) alarms, signs, and warnings; 5) buddy system; or 6) training.

ANSI: American National Standards Institute. A group engaged on a national level to develop voluntary consensus standards.

Confined Space: A space that 1) is large enough and so configured that an employee can enter and perform assigned work, and; 2) has limited or restricted means of re-entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry), and; 3) is not designed for continuous employee occupancy. See also “Permit-required confined space.”

Decibel: A unit of measure to express relative sound pressure on a logarithmic scale.

Engineering Control: A method of control that eliminates or reduces a hazard through one of the following strategies: 1) elimination (e.g., designing the facility, equipment, or process to remove the hazard, or substituting processes, equipment, materials, or other factors to lessen the hazard); 2) enclosure of the hazard using enclosed cabs, enclosures for noisy equipment, or other means; 3)

isolation of the hazard with interlocks, machine guards, blast shields, welding curtains, or other means; or 4) removal or redirection of the hazard, such as with local and exhaust ventilation.

EPA: Environmental Protection Agency. The U.S. federal agency charged with enforcing environmental and protection laws and regulations.

HA or JHA: Hazards analysis or job hazards analysis. Technique that focuses on job tasks as a way to identify hazards before they occur.

NIOSH: National Institute for Occupational Safety and Health. The U.S. federal agency that conducts research and makes recommendations to prevent worker injury and illness.

NRR: Noise reduction rating. A numerical figure given to a device to signify how much it diminishes the sound level entering your ears.

OSHA: Occupational Safety and Health Administration. The main U.S. federal agency charged with the enforcement of safety and health legislation.

Permit-required Confined Space: A confined space that has one or more of the following characteristics: 1) contains or has a potential to contain a hazardous atmosphere; 2) contains a material that has the potential for engulfing an entrant; 3) has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and

tapers to a smaller cross-section; or (4) contains any other recognized serious safety or health hazard.

Personal Protective Equipment (PPE): Equipment worn to minimize exposure to hazards that cause serious injuries and illnesses.

TWA: Time weighted average. Average concentration of an airborne contaminant to which a person is exposed in any 8-hour work shift of a 40-hour work week.

UV: Ultraviolet radiation. That portion of the electromagnetic spectrum between 40–400 nm. The sun is the primary natural source of UV radiation. UV-A and UV-B are the most harmful portions of the UV spectrum and can damage eyes and skin.

WCO: Wildlife control operator. Person engaged in activities associated with wildlife damage management.

WDM: Wildlife damage management. Reduction of damage caused by or related to the presence or behavior of wildlife.

Key Words

Cold, Environmental threats, Hazards, Heat, Ladders, OSHA, Personal Protective Equipment, Physical safety, Respirator, Risk

Disclaimer

Wildlife can threaten the health and safety of you and others in the area. Use of damage prevention and control methods also may pose risks to humans, pets, livestock, other non-target animals, and the environment. Be aware of the risks and take steps to reduce or eliminate those risks.

Some methods mentioned in this document may not be legal, permitted, or appropriate in your area. Read and follow all pesticide label recommendations and local requirements. Check with personnel from your state wildlife agency and local officials to determine if methods are acceptable and allowed.

Mention of any products, trademarks, or brand names does not constitute endorsement, nor does omission constitute criticism.

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Appendix

Extension and Step Ladder Safety

Extension Ladder Safety

Place the ladder at a suitable site (firm, stable, level, and away from foot and vehicle traffic). Position the base at the wall of the structure and walk the ladder up to a vertical position by pushing up the ladders with your hands as you move your hands down the rungs until the ladder is vertical. Using the rope, extend the ladder to a length at least 3 feet higher than the edge of the roof or landing to be accessed. Ensure the proper ladder angle; for every 4 feet of vertical distance, the ladder should be 1 foot from the base of the supporting structure (4:1 ratio). For a roof edge that is 20 feet high (rise), the base of the ladder should be 5 feet out from the eave (run) to achieve a 4:1 ratio (Figure 10). To test for proper alignment of the ladder, place your feet at the base of ladder and extend your arms straight ahead (parallel to the ground). If the angle is appropriate, the palms of your hands should reach a rung on the ladder.

Make sure that the ladder's rung locks are engaged before climbing. Check that the ladder's feet are flush to a clean, dry, surface capable of holding the ladder in place. Use ladder straps or other devices to secure the base of a ladder to prevent ladder kick-outs (Figure 11). Kick-outs occur when the base of the ladder dislodges from the ground.

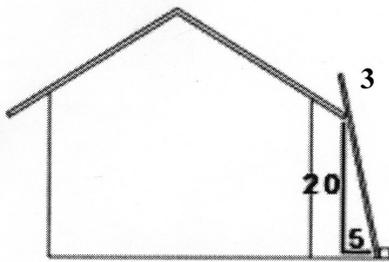


Figure 10. Diagram of the proper positioning of a ladder, with a 4:1 ratio of rise to run.



Figure 11. Ladder straps (left) can help reduce kick-outs and a stabilizer (right) keeps a ladder away from a structure.

Secure the top of the ladder to the roofline to prevent the ladder from sliding horizontally. Failure to tie off a ladder allows wind gusts to push the ladder off the structure, leaving you stranded on the roof or injured if you fall. Stabilizers can reduce side-to-side motion by widening the contact of a ladder with a structure (Figure 11). Standoffs stabilize ladders and prevent damage by keeping the ladder away from sensitive surfaces, such as gutters. Some standoffs allow the ladder to be placed at a corner of a building. Although not as secure as professionally manufactured devices, rope or strong wire can be used to secure the ladder to gutter spikes or screws fastened to the fascia board. Dismount by stepping sideways onto the roof. Do not step over the top of the ladder to climb on the roof. Keep in mind that temperature fluctuations in the spring and fall can cause surfaces to be slippery due to condensation.

Equipment for fall protection may be needed for some jobs, particularly when the task is conducted at heights and involves anything more than inspection of the roof area. Ways to achieve adequate fall protection that are consistent with OSHA regulations is outside the scope of this publication. Consult safety equipment suppliers for more information.

Anchoring Tips - Prevent Kick-out with Extension Ladders

1. Move a vehicle bumper close to the base of a ladder.
2. On decks or wooden surfaces, get permission to nail a 2"x 4" behind the feet of the ladder.
3. On soil, use long stakes to anchor the base of the ladder to the ground (first call Dig Safe® or a similar company to locate underground utilities).
4. Use equipment specifically designed to stabilize the base, if the ladder is on uneven ground. If you cannot secure the base, choose another place for the ladder.
5. Inspect equipment frequently and do not use damaged ladders.
6. Pad ropes so they do not chafe against roof edges.
7. Be aware of electrical services to avoid electrocution. Maintain as much distance as possible from overhead power lines and conductors, never closer than 10 feet. Use fiberglass ladders when working near live electrical services. If it is necessary to access areas closer than 10 feet from overhead conductors and power lines, call the electrical company to discuss the situation and possible approaches to safely conduct the work (e.g., power interruption, shielding).

Step Ladder Safety

Select a step ladder appropriate in height and use for the situation. Reduce fatigue by using platform step ladders when in one location for an extended period of time. Never stand on the top two steps or use a step ladder when it is closed. Fully extend and press the locks into place before climbing. Always stand in the middle of each step and only stand on rungs designed to be steps.
